SEDAR Data Workshop for yellowtail snapper, *Ocyurus chrysurus*

The SEDAR (SouthEast Data, Assessment, and Review) Data Workshop for yellowtail snapper was held from 1 p.m., March 3 until 5 p.m., March 4, 2003 in St. Petersburg, Florida, at the Florida Fish and Wildlife Conservation Commission's Florida Marine Research Institute (FWC-FMRI, see Yellowtail SEDAR Data Workshop Agenda). Stu Kennedy, FWC-FMRI, was the convener and representatives were present from the FWC-FMRI, the National Marine Fisheries Service (NMFS), non-governmental organizations, the commercial and headboat industries, and the Gulf of Mexico and Caribbean Fishery Management Councils (see List of Participants). Panelists agreed to summarize the discussion in this report and to produce a CD containing all of the data discussed at the Workshop. This would then be provided to the Gulf, South Atlantic, and Caribbean Fishery Management Councils and to participants of the SEDAR Stock Assessment Workshop for yellowtail snapper.

This report is the summary of discussions held at the meeting convened for the purposes of identifying any pertinent information or datasets for yellowtail snapper that would be useful in conducting an assessment(s) of the stock(s). Major focus was in discussions of the validity and limitations of the available data. The Panel decided that FWC-FMRI analysts would conduct the assessment only for the stock of yellowtail snapper found in South Florida (see Stock Structure section below). NMFS representatives indicated that during this workshop they would be evaluating whether an assessment could be conducted for two separate yellowtail snapper stocks found in the Caribbean near Puerto Rico and the U.S. Virgin Islands.

A. Life History

Stock Structure

Theresa Bert, FWC-FMRI, gave a summary of the value of genetics to the identification of stock structure of marine fishes and an overview of the preliminary findings for a yellowtail snapper study (Wallace et al. 2003). She described several limitations to the study including low sample sizes, restricted geographic coverage, and the use of only one genetic technique (a second microsatellite analysis is underway). Results of yellowtail snapper mtDNA analyses indicated that there was little population structuring between the Florida Keys, Southeast Florida, and Puerto Rico groups of yellowtail snapper. However, there was some evidence for isolation-by-distance between South Florida and the Puerto Rico samples. It was pointed out that additional samples should be obtained from yellowtail snapper collected in the western and southern Gulf of Mexico, Bermuda, Azores, Central American coast, and in other areas of the Caribbean, especially the Bahamian banks where the population was thought to be very large. The Panel recognized that yellowtail snapper larvae may be exchanged between assessment areas but assumed that the majority of recruits to each stock assessment area probably came from adults occupying that area. Panelists felt that adult movement between assessment areas was probably very limited.

DECISIONS:

1. *Separate assessments should be conducted, if possible, for three separate yellowtail snapper populations in waters adjacent to: a.) South Florida, b.) the Puerto Rican platform area, including St. John, St. Thomas, and the British Virgin Islands, and c.) St. Croix.*

Age, growth, maturity, and sex ratios

Data are available from yellowtail snapper life history studies conducted off the Tequesta area of Southeast Florida (FWC-FMRI, 2000-2002), the Middle Florida Keys (FWC-FMRI, 1999-2002), Puerto Rico (Dennis 1991; Figuerola 1998), and the U.S. Virgin Islands (Manooch and Drennon 1987). In addition, the NMFS-Beaufort Headboat Survey Program (1980-2002) and NMFS-Panama City Bioprofile Sampling Program (1980-1981; 1992-2001) have been routinely collecting biostatistics from the southeastern U.S. headboat and commercial yellowtail snapper landings. The FWC-FMRI studies provide data on lengths, age, individual body weights, gonad weight, sex, and maturity state of yellowtail snapper collected by researchers using a stratified random sampling design employing primarily fish traps off Tequesta and primarily hook-and-line gear off the Middle Florida Keys. The NMFS-Beaufort Headboat Survey intercepts headboats at landing docks and samples landed fish for otoliths, lengths, sex, and individual weight. The NMFS-Panama City program collects individual lengths, otoliths, and sex from commercial landings of yellowtail snapper. Panelists also mentioned other available data sets for yellowtail snapper length and age. NMFS-Beaufort should have the otoliths or ages from a study conducted off the U.S. Virgin Islands during the 1983-1984. Nancie Cummings, NMFS-Miami, will contact NMFS-Beaufort about the disposition of the samples analyzed by Manooch and Drennon (1987). Ages, lengths, and gonad weights were determined for yellowtail snapper by Allyn Johnson and John Finucane (NMFS-Panama City, Johnson 1983) during the late 1970s-early 1980s. Another study of yellowtail snapper growth was mentioned as being conducted by the U.S. Virgin Islands Department of Natural Resources during 1996-1997. There were approximately 1,500 otoliths from yellowtail snapper collected during 1994-1999 by an East Carolina University Masters student that were re-aged by NMFS-Beaufort staff (Garcia, et al., In press). Many of these otoliths have deteriorated during years of being stored in clove oil and are unreadable. Since the ageing methods of this study may not be consistent with those of FWC-FMRI and NMFS-Panama City researchers, the Panel suggested that NMFS-Beaufort staff read a test sample of otoliths read by FWC-FMRI and NMFS-Panama City researchers to verify that age determination methods are consistent. If these results are similar, then the growth information generated from the re-aged 1994-1999 otoliths need to be compared with comparable data developed from well-kept otoliths collected from the same fishery during 1994-1999 to verify correct age determination for the re-aged otoliths.

Age determination of yellowtail snapper has been made using banding patterns seen on the surface of sagittae sections, with excellent agreement between FWC-FMRI and NMFS-Panama City readers (average percentage errors <1%, Robert Allman, NMFS-Panama City personal communication). Marginal increment analysis provides evidence that the opaque bands seen on otoliths form once each year, mostly during April-June. All available age data from FWC-FMRI and NMFS-Panama City are based

on calendar year, i.e., otoliths were advanced a year in age after January 1st if their edge-type was a nearly complete translucent zone. For yellowtail snapper this means that most fish begin the calendar-year-based age 1 at about 6-9 months chronological age (peak spawning occurs April through June). All other age data need to be assigned using a January 1st hatch date or needs to be accompanied by careful documentation of the age assignment definition.

In these studies, the ages of sampled yellowtail snapper ranged from 1 to 17 years. Individual databases had fish ranging from 1-8 years off Tequesta (FWC-FMRI fishery-independent fish trap survey), 1 to 13 years old off the Middle Florida Keys (FWC-FMRI fishery-independent hook-and-line survey), 1-17 years old in the Southeast U.S. region (NMFS-Beaufort Headboat Survey Program, NMFS-Panama City Bioprofile Sampling Program). In all studies most yellowtail snapper sampled were less than age 5. Fishermen on the Panel noted that the old fish that appeared in the relatively small samples taken from the Marathon/Key West/Islamorada commercial fishery prior to 1983 could have been captured in the Bahamas and landed in the U.S., a practice that continues to a lesser extent today.

Sizes of yellowtail snapper sampled for ages were mostly 225-450 mm TL in the FWC-FMRI hook-and-line and trap studies, 300-550 mm TL in the NMFS-Beaufort Headboat Survey hook-and-line samples, and 214-680 mm FL (mostly 300-435 mm TL) in the commercial TIP samples (NMFS-Panama City Bioprofile Sampling Program). The commercial TIP data appeared to show evidence of a strong, 1994 year-class moving through the fishery during 1996-1998.

Sexual maturity ogives (a schedule of the proportion of fish in the population that are mature at each age) for yellowtail snapper collected off the Florida Keys indicated that about 35% of age-1 yellowtail snapper were mature and nearly all of age-2 fish and older were sexually mature. Spawning occurs over a long time period in the Florida Keys, February-November, with a peak in April-June. There was no evidence for yellowtail snapper spawning off Tequesta in Southeast Florida but some researchers believed that these fish did spawn each year but in other areas. Yellowtail snapper are gonochorists and indeterminate spawners; no valid fecundity data are available.

Natural mortality rates

Using data from studies conducted in the Caribbean, estimates of natural mortality (instantaneous rate M) calculated using a Pauly relationship (Pauly 1980) ranged from 0.32 to 0.44 per year. However, yellowtail snapper as old as 17 years have been found in the heavily fished South Florida stock, supporting an argument for a relatively low M. As a rule of thumb for exploited stocks, Gabriel et al. (1989) suggested that M=3.0/maximum observed age and for yellowtail snapper M=3.0/17=0.18 per year. There were no data suggesting other than a constant natural mortality with age.

DECISIONS:

1. *Life history information for the South Florida assessment should come from the FWC-FMRI fishery-independent life history study.*
2. *Male and female growth and mortality will be assumed equal in the analyses.*

3. *Gonad weight-age relation will be used to generate a proxy for spawning stock.*
4. *All ages used in the assessment should be referenced to a January 1 hatch date.*
5. *The instantaneous natural mortality rate, M, used in the assessment of the South Florida resource should range from 0.2 to 0.4 per year.*
6. *Constant natural mortality across ages should be assumed.*

B. Sources of Removals

Commercial Fisheries

Even given the lack of genetic stock structure, the South Florida fishery could be broken up into logical spatial components: eastern Gulf waters (including Monroe and Atlantic side of Keys) and southeast Florida Atlantic waters (Dade county north). Outside these regions there are fisheries throughout the Caribbean, portions of Mexico, Cuba, and Venezuela, all with substantial landings according to FAO documents (western Central Atlantic landings, 1970-2001). Puerto Rico commercial landings have been estimated or recorded by species since 1969. However, landings data prior to 1983 are not yet available (Nancie Cummings, NMFS-Miami, has requested the earlier landings data). Only aggregate species groups are reported in U.S. Virgin Islands commercial landings and will need to be apportioned to species using samples taken from the landings where species have been identified (NMFS-TIP data from biostatistical sampling). Additionally, U.S. Virgin Islands landings records are still being computerized and verified; with 1975-1985 data may be available by September 2003. The date that more recent data will become available is not known. Landings for U.S. waters are available from the NMFS Statistical Bulletins (1950-1961), NMFS General Canvass of Dealers (1962-2001) and from the FWC-Marine Fisheries Information System (Trip ticket, 1985-2001). Landings of yellowtail snapper recorded in the NMFS Federal Logbook System for reef fish fishermen shows generally good agreement with landings reported in the Florida trip-ticket system.

Commercial fishermen participating in the Data Workshop indicated that they felt the accuracy of reported commercial landings was quite low. They believed that beginning with 1985 Florida trip tickets, an increasing portion of the actual yellowtail snapper landings in South Florida has gone unreported or has been reported as other species, increasing to 30-40% of the total landings by 2003. If annual numbers of Florida fishery landings violations are available, they should be checked to see if an increasing trend in violations is seen that supports these assertions that under-reporting has increased. In Puerto Rico, reported commercial landings have increased from 50,000 pounds in 1983 to 300,000 pounds in 2001, but this is in large part because fishermen have increased their reporting rate due to financial incentives (e.g., landings records help qualify for disaster relief eligibility) and newer licensing requirements. Corrections in landings to account for changes in compliance with landings laws have been estimated using information from fishermen surveys conducted every five years. Also, dealers in Puerto Rico may keep separate records of landings and these may be more accurate. NMFS-Miami personnel are working with Puerto Rico staff to obtain the needed compliance data.

The Florida trip-ticket data indicate that the number of trips reporting yellowtail snapper landings declined beginning in 1992-1993 (concurrent with, and possibly due to, implementation of the regulations for the snapper/grouper complex). The gear used in the commercial fishery is mostly hook-and-line, with some trap landings from the eastern Gulf/Florida Keys region. Most commercial catch and effort occurs in waters 40-100 feet deep.

Data on commercial fishing trips in Puerto Rico, collected in 1983 and then 1985 to the present, is available from the NMFS TIP Sampling Program database. Information includes complete trip records for species-specific catch, length structure, individual weights, and sex ratios. Most of the landings are with "bottom lines", which is a hook-and-line gear that is fished initially on the bottom then higher and higher in the water column to chum the fish toward the surface. All "bottom line" fishing is considered to be for yellowtail snapper, mostly occurring at night with lights. There were NMFS-TIP interviews made for the U.S. Virgin Islands fisheries off north St. Thomas and St. John during 1993 then again in 2003, but these were discontinued in March 2003. Interviews under the NMFS-TIP Sampling Program have been conducted in St. Croix since about 1986 with a total of 10,000-12,000 records available.

The size distributions of commercially landed yellowtail snapper were similar among gears in South Florida, except for the larger-sized fish caught in a stab-net fishery that operated for short time during the mid 1980s in the Florida Keys. Otherwise, there has been little change over time in the lengths of yellowtail snapper landed by the U.S. commercial fishery.

Some information on the quantity of commercial discards was collected by the NMFS-Southeast Fisheries Science Centers during August 2001-July 2002 but these data are still very preliminary. Many yellowtail snapper are released alive and most are noted as regulatory discards (probably too small but no measurements were taken). NMFS-Miami analysts are still working on some more sophisticated analytical techniques to estimate the number of discarded yellowtail snapper, but current estimates indicate that discard rates are relatively low (Poffenberger 2003). A non governemental organization representative stated that low rates could be expected from a self-administered bycatch logbook program. This opinion was supported by a wholesale dealer's observation that many fishermen disliked filling out the bycatch logbook. There was a feeling that it was to a commercial fisherman's advantage to report little or no discards rather than to report accurately. However, there was also an opinion by a commercial fisherman that fishers would not be waste time catching undersized fish so discards from the commercial fishery may be low. There was little information from a NMFS bycatch characterization study for fisheries in the eastern Gulf of Mexico (Galveston and Miami Laboratories 1995), with only one dead release out of 11 discards from a catch of 21 yellowtail snapper in fish traps. The release mortality of yellowtail snapper has not been studied but fishermen at the workshop believed it was relatively low, 8-10%. Also, fishermen indicated that there has been an increase in the use of small yellowtail snapper as live bait for black grouper. In their opinion this was getting to be a big problem with the large charterboats that operated occasionally under commercial licenses.

Commercial fishermen participating in the workshop indicated several factors that affect the observed landing made by fishermen. There are strong interactions among the fisheries for different fishes in South Florida where fishermen regularly switch from kingfish or dolphin to yellowtail snapper and other snappers and groupers. The South Atlantic Fishery Management Council's licensing requirement are less strict than the Gulf of Mexico Fishery Management Council's so some fish caught in the Atlantic are reported as caught in the Gulf to build up sufficient landings record from the Gulf to qualify for license renewals. Some landings of yellowtail snapper may sometimes be reported as other species to maintain eligibility requirements for license renewals. With the advent of a restricted species requirement in Florida in February 1990 many fishermen fished closer to shore because there was no commercial bag limit in state waters until ????. Conversely there were monetary incentives for reporting landings from Federal waters even if they are taken in State waters.

DECISIONS:

1. *A sensitivity analysis should be run using commercial landings estimates for South Florida calculated under assumption that there was a linear increase in unreported commercial landings from 0% in 1985 to 35% in 2001.*
2. *The time frame of the South Florida assessment should be 1981-2001.*
3. *A report is needed describing the levels of compliance to catch reporting requirements in Puerto Rico and the U.S. Virgin Islands. NMFS-Miami staff are working with Puerto Rico Department of Natural Resources staff on this.*
4. *Assume a release mortality rate of 10% for the commercial fishery.*
5. *Collate any fishery law enforcement data to test whether landings violations have increased.*

<u>Recreational fisheries</u>

The U.S. recreational fishery is monitored by the NMFS-Marine Recreational Fishery Statistics Survey (NMFS-MRFSS) for shore-based, private/rental boat, and charterboat fishermen. Data are available since 1979, but generally considered valid only since 1981. The NMFS-Beaufort Headboat Survey estimates the landings made by anglers fishing from headboats operating from North Carolina to Texas (1982-present for Atlantic, 1986-present for the Gulf) using logbooks collected from headboat captains. Both of these surveys indicate a decline in the landings of yellowtail snapper since at least the mid 1990s. It was noted that there was a change in how charterboat catches were estimated by the NMFS-MRFSS beginning in 2000. For comparability, the Panel felt that charterboat catch estimates made using the old estimation procedure should be used in the assessment. In general, it was noted that there are relatively few intercepts of fishermen who had caught or sought yellowtail snapper each year in the NMFS-MRFSS.

In the Caribbean, the NMFS-MRFSS has estimated the recreational catch for Puerto Rico in 1981 and during each year from 1999 to the present. In the U.S. Virgin Islands, recreational tournaments are monitored for catch and biostatistics, although these tournaments mostly target billfishes. Occasional studies using volunteer logbooks recorded by charterboats and telephone surveys provided estimates of recreational catch and effort. However, this was terminated at the end of FY02. In general the recreational

landings for yellowtail snapper is believed to be very small in this region compared to the commercial landings.

Both the NMFS-MRFSS and the NMFS-Headboat Survey examine and measure fish in the landings. NMFS-MRFSS data indicated the presence of very small yellowtail snapper in shore-based angler creels in some years. The Panel members agreed that it was plausible that small yellowtail snapper were caught near shore. Otherwise lengths of MRFSS and the Headboat Survey showed no consistent differences in lengths of fish landed between seasons or years. Larger yellowtail snapper were seen in the angler landings in 1985-1987 and unusually small fish (125-300 mm TL, shore mode catch) were seen in 1999-2001. Fishermen suggested that when recreational size and bag limits were put in place, there was an increase in high grading so that only larger killed fish will be seen in the samples taken from the landings.

While discard estimates (NMFS-MRFSS Type B2 catch or fish released alive) are available from NMFS-MRFSS, there are no data on the quantity of discards from headboats. Fishermen on the Panel believed that the proportion of the catch discarded by the headboat fishery would be higher than that estimated for the commercial fishery but did not give a clear indication as to how much higher. FWC-FMRI analysts will attempt to find any discard data that might be available from scientific studies on headboats, e.g., Mote Marine Lab's reef fish tagging or Biscayne Bay fishery surveys. Otherwise the length distribution of yellowtail caught by scientific surveys will be compared to the lengths of landed fish to determine the likely release estimates.

Mortality rates for yellowtail snapper released alive by anglers were thought to be less than 50%, some panel participants thought much less. The release mortality rate of yellowtail released by anglers fishing from headboats was thought to be lower than for the recreational fishery, probably averaging 30% because headboats fish in shallower depths (when fishing is on schools of yellowtail snapper and they are chummed to the surface even lower release mortality rates are likely). The mortality of yellowtail released by headboat fishermen fishing north of Miami may be as high as that for recreational fishermen since fishing there occurs in 50-120' water depths.

DECISIONS:

1. *Assume the size distribution of the Type B1(killed but not available to the creel clerk) landings is the same as Type A (killed and available to the creel clerk).*
2. *Nancie Cummings (NMFS-Miami) suggested adjusting the Types B1 and B2 catch estimates by the non-interviewed catch.*
3. *Recreational release mortality advice was vague. Recommend using the range of 20-40% in a sensitivity analysis. Robert Dixon, NMFS-Beaufort, will provide additional guidance on the release mortality rate from headboats. The size structure of releases will be obtained from the difference between scientific hook-and-line survey yellowtail snapper lengths and Type A yellowtail snapper lengths*

C. Indices of Abundance

A number of fishery-independent surveys capture or observe yellowtail snapper in South Florida. Visual census information has been gathered under the NMFS Visual Census Survey Program (1979-present), the Reef Environmental Education Program (REEF) Reef Fish Survey Project (1993-present), the FWC-FMRI Fishery Independent Monitoring Program's Visual Survey (1999-present), and SEAMAP Reef Fish Survey. The latter two surveys were considered to be too short a time series (FWC-FMRI) or to have occupied too few stations in a limited area (SEAMAP) to be used as indices in this assessment. The NMFS Visual Census Survey has been conducted since the 1970s along most of the Florida reef track from the southern Keys to off Biscayne Bay. Concern was raised by the Panel as to the consistency of the geographic coverage of the survey over time. Standardized annual relative abundance estimates were provided to FWC-FMRI analysts by Steve Smith, University of Miami-RSMAS, for juveniles (< 190 mm TL), adults (>=190 mm TL), and exploited phase fish (>305 mm TL). There was a high degree of variability and some inconsistency between juvenile and adult indices. Concern was expressed that the recent prohibition of fishing in some of the survey area could have resulted in an increase in the index that may not have been reflective of the abundance of yellowtail snapper throughout their range. The Panel requested that further information about the survey and estimation procedures be gathered. The REEF Fish Survey Project is an opportunistic survey conducted by trained volunteer divers during their normal recreational activities. Survey sites range throughout South Florida.

NMFS-commercial logbook reports (1993-2001) were analyzed by FWC-FMRI staff to identify the species complex associated with yellowtail so that a subset of the data could be designated as potential yellowtail snapper fishing trips. Identifying yellowtail snapper trips was somewhat problematic since, even on trips where yellowtail snapper occur, they make up less than 40% of the catch. Steve Turner, NMFS-Miami suggested that the system used to define associated species developed by Dennis Heineman and Shannon Cass-Calay, NMFS-Miami, be considered. Logbook catch rates showed a decline on the Atlantic coast and a flat trend on the Gulf coast, trends which the fishermen on the Panel seemed to agree with.

Conversely, trip-ticket catch rates for South Florida showed a general increase between 1987 and 2001. Fishermen suggested that the jump in catch rates seen in 1999 is possibly due to a series of earlier regulations (restricted species endorsement in February 1990 and Federal licensing requirements) that caused all but professional fishermen to drop out of the fishery. If vessels could be identified as staying under the control of the same captain then the effect of this change in fishing-ability could be incorporated into a standardization model, although NMFS-Miami analyst Mauricio Ortiz has had little success performing such analyses.

Catch-and-effort data from the recreational fisheries was used to develop fisheries-dependent indices of abundance by FWC-FMRI staff. For NMFS-MRFSS data, fishing effort expended for yellowtail snapper was defined as all fishing trips that caught (landed or released) yellowtail snapper and all trips where anglers interviewed after the fishing trip indicated that they had been fishing for yellowtail snapper. The total-catch-

per-trip data were used in a general linear model standardization to estimate standardized annual total-catch rates. Independent variables used as model effects were: number of anglers, wave, mode of fishing, area fished, and targeting. For Headboat Survey data, fishing effort for yellowtail was defined as all headboat trips fishing in South Florida. The landings-per-trip data were used in a general linear model standardization to estimate annual landings rates. Variables used as effects in the model were: year, month, region, time fished, and number of anglers. Since the Headboat Survey landings rates may have been affected by changes in regulations -- in 1990, a ten snapper aggregate bag-limit in was implemented in Gulf Federal waters; on 11 December 1987 a ten snapper aggregate bag-limit was implemented for anglers fishing in Florida state waters -- it was recommended that the data be divided into two time series (before and after regulations) and re-standardized.

The Panel tried to determine if any indices should not be used in the South Florida yellowtail snapper assessment model or if any should be modified. The Panel suggested that the Headboat index series be broken into two survey periods before and after the federal aggregate bag-limit was implemented (1990). Dr. Bob Dixon, NMFS-SEFSC-Beaufort, also suggested that the 1978-1980 data should not be used because sampling and estimation methods were somewhat inconsistent with the rest of the data series. Without consensus as to the validity of each survey, the Panel agreed that all surveys could be used and that sensitivity analyses should be conducted such that one assessment be conducted using all indices, another assessment be conducted using only fishery-independent indices, and yet another assessment be conducted using only fishery-catch rate indices. In addition, reports should be written that would explain in detail how each index was developed from the data. Ideally only fishery-independent indices should be used in the assessment to avoid the confounding effect of changes in fishermen behavior. However, the fishery-dependent catch rates were estimated across a much larger geographic range, which could be a deficiency of the fishery-independent survey if they measure only local and not global stock abundance. Also, Don DeMaria, an experienced diver, felt that yellowtail snapper might avoid divers so that there may be behavioral difficulties in visually surveying this species. Thought should be given to identifying common criteria for the definition of a yellowtail snapper fishing trip in the three main fisheries. It is possible that different definitions cause the differences seen in the fishery-dependent indices of abundance.

Several fishery independent surveys are conducted in the Caribbean region, including a handline and trap (1988-89, 1998-2001) finfish survey conducted off Mayaguez, Puerto Rico, SEAMAP Puerto Rico (1990-1991,1994-2000?), SEAMAP U.S. Virgin Islands St. Croix (1993-1994, Dixon and Maidment 1994), St. Croix (2000-2002, Tobias et al 2002), St. Thomas (1999-2000, Gomez 2000), and St. Thomas (1993-1994, Dixon and Maidment 1994), Department of the Interior Visual Survey in U.S. Virgin Islands (such as Mateo 2001 and 2002), East Coast Puerto Rico study off Collebra (1996-1997), and Turromote - SW Puerto Rico survey (1995- present?).

DECISIONS:

1. *All fishery-dependent indices (Headboat, Logbook, and MRFSS) need to be based on a consistently defined "yellowtail snapper trip", e.g. a common species catch composition)*
2. *Split the Headboat Survey landings-rate series into pre-1991 and 1991-onward series to account for the potential effect of implementing the aggregate bag limit.*
3. *Generate reports to be presented at the Stock Assessment Workshop describing the standardization procedure used to estimate fishery-dependent catch rates. It may be important to settle on a common method for determining which fishing trips qualify as yellowtail snapper trips.*
4. *Sensitivity analyses should be conducted such that one assessment be conducted using all indices, another assessment be conducted using only fishery-independent indices, and yet another assessment be conducted using only fishery-catch rate indices.*

D. Stock Assessment Analyses

The Panel felt that given the poor relationship of length to age, there was little age structure information imbedded in the length samples available for yellowtail snapper. Although still requiring an estimate of growth rate, the Panel felt that the primary stock assessment method employed in South Florida should be an Age-Structured Biomass Dynamic model. In addition, attempts should be made to construct an age-structured sequential population analysis in parallel to any biomass-based model.

In the Caribbean, data on yellowtail snapper landings, fishing effort, and relative abundance information appear to be substantially limited. There is on-going work to recover and computerize some historical data. At this point the Panel recommends development of valid fishery-dependent and fishery-independent catch rate trends to assess the relative condition of the population. Also, the gathering of and adjustments to the landings data should continue to move forward in this region.

DECISIONS:

1. *Develop an Age-Structured Biomass Dynamic model as a primary assessment tool for yellowtail snapper populations in South Florida. Also, attempt to integrate available data within an age-structured assessment as a additional investigative method.*
2. *For the Caribbean population of yellowtail, develop valid catch rate estimates for the fishery and for fishery independent surveys.*

<u>Environmental effects on catch rates</u>

There are strong indications that environmental factors affect the availability of yellowtail snapper to fishermen. Catch rates off the Southeast Florida coast are depressed during periods of cold water intrusions from upwelling events caused by a sudden offshore displacement of the Gulf stream, the duration of the typical intrusion is perhaps two weeks or more. Fishermen also suggested that rapid releases of large amounts of freshwater from the storm-water control structures in Southeast Florida depresses catch

rates or changes the distribution of yellowtail snapper and other fishes in Southeast Florida waters. There was an opinion among Panel fishermen that increasingly poor water quality off Southeast Florida has reduced recruitment of yellowtail snapper to that area. After severe storms off the Southeastern U.S. coast there are usually 4-5 days of extremely high catch rates of yellowtail snapper, especially with winds out of the northeast. This has been observed after the passage of hurricanes.

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List of Datasets

1. Results of yellowtail snapper mtDNA analyses (FWC-FMRI, 1998-2002).

2. Data from a life history study conducted off the Tequesta area of Florida (FWC-FMRI, 2000-2002).

3. Data from a life history study conducted off the Middle Florida Keys (FWC-FMRI, 1999-2002).

4. Data from a life history study conducted off Puerto Rico (Dennis 1991; Figuerola 1998).

5. Data from a life history study conducted off theU.S. Virgin Islands (Manooch and Drennon 1987).

6. Landings, landings rates, and bioprofile data from the NMFS-Beaufort Headboat Survey Program (1980-2002).

7. Bioprofile data from the NMFS-Panama City Bioprofile Sampling Program (1980-1981; 1992-2001).

8. Data from a life history study conducted off the U.S. Virgin Islands during the 1983-1984 (Manooch and Drennon 1987).

9. Ages, lengths, and gonad weights of yellowtail were determined for yellowtail snapper by Allyn Johnson and John Finucane (NMFS-Panama City, Johnson 1983) during the late 1970s-early 1980s.

10. A life history study from the USVI Department of Natural Resources 1996-1997, GCFI publication????

11. Data from about 1,500 yellowtail snapper sampled for otoliths 1994-1999 by an East Carolina University Masters student (Garcia et al. In Press).

12. Yellowtail landings from FAO documents (western Central Atlantic landings, 1970-2001).

13. Puerto Rico commercial landings estimated or recorded by species since 1969. However, landings data prior to 1983 are not yet available (Nancie Cummings has requested the earlier landings data).

14. U.S. Virgin Islands commercial landings (as available).

15. Commercial landings for U.S. waters are available from the NMFS Statistical Bulletins (1950-1961)

16. Commercial landings from the NMFS General Canvass of Dealers (1962-2001)

17. Commercial landings and trip ticket data from the FWC-Marine Fisheries Information System (Trip ticket, 1985-2001).

18. Trip landings and characteristics recorded in the NMFS Federal Logbook System for reef fish fishermen or NMFS-commercial logbook reports (1993-2001.

19. NMFS-Marine Recreational Fishery Statistics Survey (MRFSS) for shore-based, private/rental boat, and charterboat fishermen, 1982-2001.

20. NMFS-Beaufort Headboat Survey estimates the landings made by anglers fishing from headboats operating from North Carolina to Texas (1982-present for Atlantic, 1986-present for the Gulf).

21. Quantity of commercial discards collected by the NMFS during Aug 2001-July 2002.

22. The NMFS Visual Census Survey Program (1979-present).

23. The Reef Environmental Education Program (REEF) Reef Fish Survey Project (1993-present)

24. Several fishery independent independent surveys from the Caribbean region, including a handline and trap (1988-89, 1998-2001) finfish survey conducted off Mayaguez, Puerto Rico, SEAMAP Puerto Rico (1990-1991,1994-2000?), Department of the Interior Visual Survey in U.S. Virgin Islands (? - ?), East Coast Puerto Rico study off Collebra (1996-1997), and Turromote - SW Puerto Rico survey (1995- present?).

Yellowtail SEDAR Data Workshop Agenda

Florida Fish and Wildlife Conservation Commission
Florida Marine Research Institute
St. Petersburg, FL

March 3-4, 2003

Objectives of Data Workshop

-- To identify and make available the appropriate data for use in the yellowtail stock assessment

Data sources

A. Life History

Stock identification

FWC Genetics

Age, growth, maturity, and sex ratios

NMFS headboat otoliths: 1717 from 1980 – 2001
TIP Commercial otoliths: 2359 from 1980, 1981, 1992, 1997, 1999 – 2001
MRFSS otoliths: 144 from 1997-2001
FWC Fishery independent otoliths : 1557 from 2000 – 2002

Natural mortality rates

Oldest aged Yellowtail snapper was 17 years and 94 out of 5775 fish were aged 10 years and older. Manooch and Drennon (1987) had a 17-year-old fish in their study of yellowtail snapper from Puerto Rico and the U. S. Virgin Islands.

B. Landings

Questions to be resolved

Time frame
Geographic regions

Commercial

NMFS Website – US landings: 1950-2001
FAO – Western Central Atlantic landings: 1970 - 2001
FWC Florida Trip tickets: 1985 - 2001

Length samples

Commercial TIP: 1984-2001

Discards ?

How much is discarded?
Release mortality?
What size / ages should be applied to dead discards?

Uncertainty surrounding landings?

Yellowtail SEDAR Data Workshop Agenda (con't)

Recreational
- MRFSS: 1981 - 2001
- Headboat: 1981 - 2001
- Texas Parks and Wildlife: 1974 – 2001 deleted because according to Mark Fischer they don't get Yellowtail snapper

Length samples
- Headboat: 1981-2001
- MRFSS: 1981-2001

Discards
- MRFSS estimates numbers of fish released alive
- How many fish are discarded by headboat anglers?
- Release mortality?
- What size / ages should be applied to dead discards. MRFSS indicates only whether the released fish were legal size.

Uncertainty surrounding landings?
- MRFSS provides proportional standard errors for their catch estimates.

C. Catch per unit effort

Fishery Independent
- NMFS – UM Visual survey: 1979 - 2001
- FWC FIM Visual survey: 1999-2001
- FWC Southeast Florida Reef fish Trapping: 2000-2002
- REEF Visual survey: 1993-2002
- SEAMAP Reef fish surveys: 1988,1991-1993,1996-1997

Fishery Dependent
- FWC Florida Trip tickets: 1985 – 2001
- MRFSS intercept data: 1981-2001
- Everglades National Park: 1972-2001 Deleted because Yellowtail snapper are rarely encountered
- NMFS Reef Fish logbook: 1993-2001

Methods of standardization?

D. Other data sources?

E. Other stock assessment issues?